

Kobuk River Test Fishing Project, 2002



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ABSTRACT

Catch statistics, and age, sex, and length catch data for chum salmon, *Oncorhynchus keta*, for the Kobuk River test fish project 2002 were summarized. A total of 218 drifts were done from July 5 through August 12 with a catch of 1,112 chum salmon. Cumulative catch per unit of effort (CPUE) were 868.75, which ranked seventh highest in the ten years of the project. The midpoint of the test net catches was on July 23, which was earlier than any other year of the project. Age-0.4 chum salmon comprised 67.2% of the test fish samples, which was the highest percentage in the history of the project. Also, average lengths of chum salmon were greater for most of the age classes than in all other years of the project.

KEY WORDS: Kobuk, Kotzebue, chum, age, catch per unit of effort, *Oncorhynchus keta*

INTRODUCTION

The Kobuk River originates on the south side of the Brooks Range in the Arrigetch ("Fingers Outstretched") Peaks inside the Gates of the Arctic National Park. The river flows roughly 500 river miles west where it terminates at Hotham Inlet. The lower two-thirds of the river are stained by tannin primarily from the Pah River, an upper river tributary. Five villages are located on the Kobuk River, Norvik, Kiana, Ambler, Shungnak, and Kobuk, and all depend on chum salmon, *Onchorhynchus keta*, for subsistence use. Residents of Kotzebue also depend on the Kobuk River chum salmon as a subsistence resource. The Kobuk River is thought to support up to 60% of the commercial catch of chum salmon in the Kotzebue District.

This was the tenth consecutive year a drift gillnet test fishing project operated in the lower Kobuk River (Lingnau, 1993; Lingnau, 1994; Lingnau, 1995; Lingnau, 1996; Lingnau, 1997; Kohler, 2000a; Kohler, 2000b; Kohler, 2001; Kohler, 2002). Because of the Kobuk River's tannic stain, test fishing is less susceptible to net avoidance by salmon than clear water systems. The only previous salmon project in the Kobuk River drainage was a counting tower, operated in 1982 and 1984, on the Squirrel River, too distant to provide timely information for fisheries management. This report presents the results of the tenth year of the Kobuk River drift test fishing project.

Management of the Kotzebue District commercial salmon fishery, particularly during the month of July, is dependent primarily on comparing commercial fishing period and cumulative season catch statistics to those of prior years. Because of the change in market demand in recent years, these comparisons are no longer reliable. The drift test fishing project was initiated because of the need for an inseason index of run timing and abundance for the Kobuk River chum salmon stocks, which largely support the first portion of the salmon migration into the Kotzebue District. While test fishing is a relatively low cost approach, it can also be susceptible to inter-annual variability in catch rates which typically requires the data to be interpreted in a somewhat qualitative way as an abundance index if calibration is not possible between years. The objectives of the test fishing project for 2002 were:

1. To evaluate chum salmon abundance migrating into the Kobuk River drainage using a comparison of systematic drift gillnet catches.
2. Describe the migratory timing for chum salmon in the lower Kobuk River.
3. Sample chum salmon for age, sex, and length.

METHODS

Site Description

The site is approximately 70 river miles from the eastern boundary of the commercial salmon fishing district (Figure 1). This site is the furthest downstream where the river runs through a single channel and is below all spawning tributaries that support spawning chum salmon. The test fish site was selected because of its desirable stream characteristics. The site consists of approximately a one mile river section located approximately three miles downstream from Kiana. The width of the river was approximately 300 meters and was divided into two sites (Figure 2). Site N is the north side of the river (right bank), which is the cut bank side of the river with the swiftest current. Site S is located on the south side of the river (left bank). Site S is located downstream from a major sandbar and has a gradual gradient. This site has the slowest current. A bottom profile at the test fish site in 1997 revealed a near uniform bottom with a maximum depth of six meters. The deepest portion of the river was in the first quartile from the right bank (Lingnau 1997).

Test Fishing

Fishing was scheduled to sample salmon passage during three different segments of the day at each of the two sites, morning (0800 h), midday (1500 h), and late evening (2200 h). A two person crew conducted drifts six or seven days per week. During the first half of the run, drifts were conducted every day of the week.

All test fishing drifts were approximately 20 minutes duration, using a 50-fathom gillnet. The net was composed of 5 7/8 in (14.9 cm) stretched mesh multifilament webbing, 40 meshes deep, and hung at a ratio of 2:1. Netting was conducted from a 20-foot boat, powered by an 85 hp outboard motor. If catch rates were high, fishing time was reduced to control mortality. Mortalities were primarily given to village elders and other individuals for subsistence purposes. The availability of chum salmon (mortalities) was announced over a CB radio.

Standardized Catches

Actual catches were converted to catch per unit of effort (CPUE) by considering fishing time and the length of net used. Each CPUE index was the number of fish, which would have been caught if 100 fathoms of net had been fished for 60 minutes. The index (I) was calculated as follows:

$$I = \frac{6,000 (c)}{(l) (t)}$$

Where: c = number of chum salmon caught
 l = length of net in fathoms
 t = mean fishing time in minutes

Mean fishing time (t) was defined as the amount of time the entire net was fishing plus half the time it took to deploy and retrieve the net. Mean daily drift CPUE indices were calculated using the sum of the total time fished and total fish caught for each day. The mean daily indices were summed to produce total seasonal CPUE indices for the period of data collection. Cumulative proportions of seasonal total test fish CPUE indices were also calculated and used to estimate the midpoint of the chum salmon run past the test fish site.

Catch rate for each time period and site was determined by using the fishing time and number of fish caught for those specific time periods and sites. Seasonal abundance by site and time period was indexed by summing CPUE indices for each of the daily sites and time periods. Temporal distribution was depicted as a percent calculated by dividing each time period total by the total CPUE indices. Spatial distribution was described as a percent by dividing each site's CPUE seasonal total by the total of both site's CPUE indices. Temporal and spatial distributions are described as a percent since the number of drifts made at each site and the amount of the time fished varied (Lingnan 1997).

Age, Sex, and Length

Age-sex-length (ASL) data were collected from up to 80 chum salmon per day. Scales were collected from the left side of the fish approximately two rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gum cards and impressions made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). Salmon were measured to the nearest one-half centimeter from the middle of the eye to the fork of the tail. The sex of each fish was determined from external characteristics.

Ages for salmon were determined by examining scales (Mosher 1968). European notation (e.g. 0.3; Koo 1962) was used to record ages; numerals preceding the decimal refer to number of freshwater annuli and numerals following the decimal refer to number of marine annuli. Total age from time of egg deposition or brood year is the sum of these numbers plus one.

Atmospheric and Hydrologic Observations

Project personnel recorded standard environmental factors during project operations at 0800 hours. Water level, water temperature, and turbidity (determined by secchi disk) were normally recorded at the site. Visual estimates of cloud cover were recorded.

RESULTS

Drifting began with the 2200 h drift on 5 July and continued through 12 August. CPUE indices were calculated for each drift and site, and are reported in Table 1, and compared graphically with other years in Figure 3. There were 1,112 chum salmon and 314 sheefish caught in a total of 218 drifts producing a cumulative chum salmon CPUE of 868.75 (Table 1). Percentages of CPUE indices were 27.98 at site N and 72.02 at site S, and 29.68, 37.73 and 32.59 percent of CPUE indices were caught at 0800, 1500 and 2200 hour drifts (Table 2). The peak catch and CPUE occurred on July 24 with a catch of 91 chum salmon, which was a mean daily CPUE of 62.76.

A total of 793 chum salmon scales were aged from the test net samples. Test fish samples were separated into four periods. Except for one period, females were the majority of samples and the comprised 55% of season's chum salmon samples. Age-0.4 chum salmon were the predominant age throughout the season. Seasonal age composition was 0.1% age 0.2, 24.8% age 0.3, 67.2% age 0.4, and 7.8% age 0.5 (Table 3). Comparisons of mean lengths during the season for all sample periods indicated males to be larger than females (Table 4). Test fishing was done once per week on the Noatak River, in late July until mid-August, with similar nets as those used at the Kobuk River project, to compare chum salmon ASL composition. In the Noatak River samples, age-0.4 chum salmon were the predominant age and females were most of the catch (Table 5). As observed in the Kobuk River chum salmon samples, males were larger than females in the Noatak River samples (Table 6).

Climatologic data indicated water temperatures fluctuated between 9 and 17 degrees C during the season. The water dropped 25 inches (63.5 cm) during the season and was at its lowest point on the August 12, the last day of project operations. Secchi disk readings ranged from 1.75 to 4 meters during the season (Table 7).

DISCUSSION

The 2002 Kobuk River test fish project operated from July 5 to August 12. A total of 218 drifts were made with a cumulative CPUE of 868.75. The total number of drifts this season ranked fourth highest out of ten years and the cumulative CPUE was the seventh highest (Appendices 1–3).

The midpoint of test net catches was on July 23, which was earlier than any other year of the project (Appendix 2). The early midpoint may have been because of the lack of a major commercial fishery harvest. Commercial harvest in 2002 was approximately 6% of the previous 9-year (1993-2001) average harvest (Appendix 4). The commercial season normally starts on July 10, and through the second week of the fishery usually over 10,000 chum salmon have been harvested. In 2002 less than 1,000 chum salmon had been harvested in the first two weeks of the commercial fishery because of the lack of a major buyer. With less fish being intercepted in the commercial fishery than usual, the midpoint of the test net catches may have been shifted earlier than normal.

Of the 3 drift periods each day, the 1500 h drift had a larger CPUE during the season compared to the 0800 h or 2300 h drifts. Larger CPUE's have occurred during the 1500 h drift in 5 of the 10 years of the project (Appendix 5). As with all previous years of the project the majority of the catches occurred at the South site.

Test fishing with gillnets does result in some selectivity in the size of fish captured. However, using the same type of net and the same mesh size each year does allow comparison between years. The 2002 chum salmon test fish catch samples had the highest observed age-0.4 fish. The percentage of age-0.4 samples was 67.2% which was above the previous record high of 66% in 1993 (Appendix 6). In the previous nine years the chum salmon scales ranged in age from 5.9 to 66.0 age-0.4 fish, with an average of 43% for that age class.

The large percentage of age-0.4 samples in 2002 may be the result of a weaker age-0.3 age class. Catches by the few commercial fishers in 2002 were poor and the cumulative CPUE at the test fish site was in the bottom half historically. With less commercial fishing the CPUE at the test fish site would likely be higher in an average escapement year as less fish are being intercepted before reaching the test net site. Comparing the returns of 1997 brood year, in 2001 and 2002, shows a big percentage increase in the test fish catch samples for the later year. Test fish catch samples in 2001 were 36.9% for brood year 1997 (age-0.3 fish) and in 2002 were 67.2% for brood year 1997 (age-0.4 fish). Historically, the percentage increase was the largest difference observed at the test fish project between fish returning from the same brood year. The large percentage of age-0.4 fish caught in the test net may have been a result of a weak 1998 brood year thereby depressing the percentage of age-0.3 fish caught.

There were no commercial catch samples taken in 2002. In previous years, comparisons of age and sex composition in the Kotzebue commercial catch samples and the Kobuk River test fish catch samples show less than 10% difference in age compositions between the two catches (Appendix 7).

Noatak River test net catch samples in 2002 had a similar sex composition as Kobuk River samples and also had a majority of age-0.4 chum salmon. Historical comparisons of Noatak River test fish samples in the last 10 years are presented in Appendix 8.

In 2002, chum salmon sampled at the Kobuk project had average lengths that were greater than all other years in most age classes (Appendix 9). Larger average lengths may have been a result of larger fish getting past Kotzebue that in other years would have been captured in the commercial fishery. However, in some years the average length of Kotzebue chum salmon commercial catch samples has been less than that of Kobuk River test fish catch samples (Appendix 10). Noatak River test net catch samples also had average lengths by age class larger than normal (Appendix 11).

There were 314 Inconnu (sheefish), *Stenodus leucichthys*, caught in the test net in 2002. In comparison to previous years the 2002 catch was second lowest out of five years. Catches of sheefish were 121 in 1997, 357 in 1999, 636 in 2000, and 744 in 2001.

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Table 1. Kubuk River drift test fish chum salmon catch per unit of effort (CPUE) by day, drift, and site, 2002.

Date	CPUE by Drift ^a			CPUE by Site ^b		Daily CPUE	Cum. CPUE
	#1 ^c	#2	#3	N	S		
5-Jul			5.00	10.00	0	5.00	5.00
6-Jul	0	2.50	7.66	3.40	3.38	3.39	8.39
7-Jul	5.05	0	31.84	1.70	22.86	12.50	20.89
8-Jul	5.11	5.11	7.74	3.48	8.39	5.98	26.87
9-Jul	5.16	0	0	0	3.33	1.70	28.57
10-Jul	5.11	7.74	7.66	0	13.43	6.63	35.40
11-Jul	2.58	30.00	34.29	10.36	34.06	22.66	58.26
12-Jul	33.96	19.59	40.00	23.01	39.04	31.54	89.80
13-Jul	12.63	15.16	35.23	0	40.25	21.67	111.47
14-Jul	5.16	59.50	10.21	17.60	37.97	28.06	139.52
15-Jul	17.50	15.00	10.21	5.18	22.86	14.27	153.79
16-Jul	38.92	38.13	27.79	13.71	52.72	35.27	189.06
17-Jul	22.50	50.64	34.62	21.22	50.37	36.50	225.56
18-Jul	17.68	34.62	20.00	5.22	41.27	24.41	249.97
19-Jul	25.00	36.00	29.71	8.00	30.00	30.30	280.27
20-Jul	60.00	38.13	34.95	37.65	51.33	44.91	325.18
21-Jul	37.43	32.00	39.27	23.84	47.17	36.30	361.48
22-Jul	27.89	31.52	39.63	15.00	48.57	33.08	394.56
23-Jul	35.89	32.31	50.42	34.72	44.91	40.00	434.56
24-Jul	25.38	83.31	74.15	35.61	84.56	62.76	497.32
25-Jul	62.70	36.92	34.62	22.66	64.36	45.64	542.96
26-Jul	41.83	39.27	20.00	6.91	55.91	34.29	577.25
27-Jul	34.29	72.86	42.35	26.85	69.55	50.41	627.66
28-Jul ^d							
29-Jul	22.74	34.29	20.00	23.33	28.14	25.74	653.40
30-Jul	17.87	28.09	38.92	17.14	39.25	28.90	682.30
31-Jul	2.58	12.63	22.50	1.74	23.01	12.68	694.98
1-Aug	38.40	19.59	25.26	10.36	43.64	27.85	722.83
2-Aug	17.14	27.50	15.16	12.00	27.38	19.93	742.76
3-Aug	12.77	45.28	15.32	15.32	34.51	25.31	768.07
4-Aug ^d							
5-Aug	32.50	5.22	0	6.96	18.59	12.86	780.93
6-Aug	25.38	32.00	10.32	1.74	40.98	23.05	803.98
7-Aug	10.11	5.16	15.16	0	19.86	10.18	814.16
8-Aug	17.50	2.61	15.48	12.00	11.91	11.96	826.12
9-Aug	5.22	12.77	7.74	3.48	13.62	8.60	834.72
10-Aug	5.22	25.00	15.16	15.32	15.21	15.27	849.99
11-Aug	17.50	15.48	0	20.14	1.74	11.10	861.09
12-Aug	5.16	7.68	10.11	0	15.00	7.66	868.75
Total	751.66	955.59	848.48	465.65	1199.13		

^a Catch per unit of effort is calculated in catch/100 fathoms of net/hour^b Site N is the North Bank (right bank when facing downstream) and Site S is the South Bank (left bank).^c Drift 1 begins at 0800, Drift 2 at 1500, and Drift 3 at 2200.^d Regular Day Off

Table 2. Kobuk River drift test fish chum salmon CPUE indices, mean CPUE and percent by drift and site, 2002.

Drift Period	Season CPUE Indices	No. of Period Drifts ^a	Season Mean CPUE	Percent	Station	Season CPUE Indices	No. of Site Drifts	Season Mean CPUE	Percent
1 0800 hr.	751.66	36	20.88	29.68	N North Bank	465.85	109	4.27	27.98
2 1500 hr.	955.59	36	26.54	37.73	S South Bank	1199.13	109	11.00	72.02
3 2200 hr.	848.48	37	22.93	32.59					
Total	2555.73	109		100.00		1664.98	218		100.00

^a One drift period is equal to one test fish drift on the north bank and one test fish drift on the south bank.

Table 3. Kobuk River age and sex composition of chum salmon test fish catch samples, 2002.

		Brood Year and Age Group				Total
		1999	1998	1997	1996	
		0.2	0.3	0.4	0.5	
Sampling Dates: 7/05-7/17						
Sample Size: 197						
Male	Percent of Catch	0.0	6.1	35.0	4.6	45.7
	Number in Catch	0	12	69	9	90
Female	Percent of Catch	0.0	4.6	42.1	7.6	54.3
	Number in Catch	0	9	83	15	107
Total	Percent of Catch	0.0	10.7	77.2	12.2	100.0
	Number in Catch	0	21	152	24	197
Sampling Dates: 7/18-7/24						
Sample Size: 225						
Male	Percent of Catch	0.0	11.1	37.3	3.6	52.0
	Number in Catch	0	25	84	8	117
Female	Percent of Catch	0.0	10.7	33.3	4.0	48.0
	Number in Catch	0	24	75	9	108
Total	Percent of Catch	0.0	21.8	70.7	7.6	100.0
	Number in Catch	0	49	159	17	225
Sampling Dates: 7/25-8/01						
Sample Size: 214						
Male	Percent of Catch	0.0	13.1	26.6	4.2	43.9
	Number in Catch	0	28	57	9	94
Female	Percent of Catch	0.5	18.2	35.0	2.3	56.1
	Number in Catch	1	39	75	5	120
Total	Percent of Catch	0.5	31.3	61.7	6.5	100.0
	Number in Catch	1	67	132	14	214
Sampling Dates: 8/02-8/12						
Sample Size: 157						
Male	Percent of Catch	0.0	12.1	19.7	3.8	35.7
	Number in Catch	0	19	31	6	56
Female	Percent of Catch	0.0	26.1	37.6	0.6	64.3
	Number in Catch	0	41	59	1	101
Total	Percent of Catch	0.0	38.2	57.3	4.5	100.0
	Number in Catch	0	60	90	7	157
Sampling Dates: 7/05-8/12						
Sample Size: 793						
			Season Total			
Male	Percent of Catch	0.0	10.6	30.4	4.0	45.0
	Number in Catch	0	84	241	32	357
Female	Percent of Catch	0.1	14.2	36.8	3.8	55.0
	Number in Catch	1	113	292	30	436
Total	Percent of Catch	0.1	24.8	67.2	7.8	100.0
	Number in Catch	1	197	533	62	793

Table 4. Length by age and sex of Kobuk River chum salmon test fish catch samples, 2002.

		Brood Year and Age Group				Total
		1999	1998	1997	1996	
		0.2	0.3	0.4	0.5	
Sampling Dates: 7/05-7/17						
Sample Size: 197						
Male	Number in Catch		12	69	9	90
	Average Length (mm)		633.3	636.1	628.9	634.5
Female	Number in Catch		9	83	15	107
	Average Length (mm)		558.9	609.3	600.7	607.2
Sampling Dates: 7/18-7/24						
Sample Size: 225						
Male	Number in Catch		25	84	8	117
	Average Length (mm)		631.6	647.1	645.5	644.2
Female	Number in Catch		24	75	9	108
	Average Length (mm)		609.4	620.4	608.3	614.7
Sampling Dates: 7/25-8/01						
Sample Size: 214						
Male	Number in Catch		28	57	9	94
	Average Length (mm)		652.9	663.2	659.4	659.7
Female	Number in Catch	1	39	75	5	120
	Average Length (mm)	565.0	616.9	619.7	634.0	618.9
Sampling Dates: 8/02-8/12						
Sample Size: 157						
Male	Number in Catch		19	31	6	56
	Average Length (mm)		639.7	665.2	660.8	656.9
Female	Number in Catch		41	59	1	101
	Average Length (mm)		609.6	620.0	595.0	615.5
Sampling Dates: 7/05-8/12						
Sample Size: 793		Season Total				
Male	Number in Catch		84	241	32	357
	Average Length (mm)		640.8	650.1	647.6	647.2
Female	Number in Catch	1	113	292	30	436
	Average Length (mm)	565.0	608.0	617.0	608.3	614.2

Table 5. Noatak River age and sex composition of chum salmon test fish catch samples, 2002.

		Brood Year and Age Group					Total
		1999	1998	1997	1996	1995	
		0.2	0.3	0.4	0.5	0.6	
Sampling Date: 7/31							
Sample Size: 40							
Male	Percent of Catch	0.0	32.5	22.5	0.0	0.0	55.0
	Number in Catch	0	13	9	0	0	22
Female	Percent of Catch	0.0	20.0	25.0	0.0	0.0	45.0
	Number in Catch	0	8	10	0	0	18
Total	Percent of Catch	0.0	52.5	47.5	0.0	0.0	100.0
	Number in Catch	0	21	19	0	0	40
Sampling Date: 8/08							
Sample Size: 56							
Male	Percent of Catch	0.0	21.4	16.1	3.6	0.0	41.1
	Number in Catch	0	12	9	2	0	23
Female	Percent of Catch	1.8	12.5	41.1	3.6	0.0	58.9
	Number in Catch	1	7	23	2	0	33
Total	Percent of Catch	1.8	33.9	57.1	7.1	0.0	100.0
	Number in Catch	1	19	32	4	0	56
Sampling Date: 8/14							
Sample Size: 75							
Male	Percent of Catch	0.0	10.7	22.7	1.3	1.3	36.0
	Number in Catch	0	8	17	1	1	27
Female	Percent of Catch	0.0	32.0	30.7	1.3	0.0	64.0
	Number in Catch	0	24	23	1	0	48
Total	Percent of Catch	0.0	42.7	53.3	2.7	1.3	100.0
	Number in Catch	0	32	40	2	1	75
Sampling Dates: 7/31 - 8/14							
Sample Size: 171		Season Total					
Male	Percent of Catch	0.0	19.3	20.5	1.8	0.6	42.1
	Number in Catch	0	33	35	3	1	72
Female	Percent of Catch	0.6	22.8	32.7	1.8	0.0	57.9
	Number in Catch	1	39	56	3	0	99
Total	Percent of Catch	0.6	42.1	53.2	3.5	0.6	100.0
	Number in Catch	1	72	91	6	1	171

Table 6. Length by age and sex of Noatak River chum salmon test fish catch samples, 2002.

		Brood Year and Age Group					Total
		1999	1998	1997	1996	1995	
		0.2	0.3	0.4	0.5	0.6	
Sampling Date: 7/31							
Sample Size: 40							
Male	Number in Catch		13	9			22
	Average Length (mm)		636.5	650.5			642.3
Female	Number in Catch		8	10			18
	Average Length (mm)		609.4	613.5			611.7
Sampling Date: 8/08							
Sample Size: 56							
Male	Number in Catch		12	9	2		23
	Average Length (mm)		610.0	636.1	715.0		629.3
Female	Number in Catch	1	7	23	2		33
	Average Length (mm)	590.0	598.5	619.7	587.5		612.3
Sampling Date: 8/14							
Sample Size: 75							
Male	Number in Catch		8	17	1	1	26
	Average Length (mm)		629.5	648.4	645.0	683.0	643.9
Female	Number in Catch		24	23	1		48
	Average Length (mm)		602.0	613.8	595.0		607.5
Sampling Date: 7/31-8/14							
Sample Size: 171		Season Total					
Male	Number in Catch		33	35	3	1	72
	Average Length (mm)		625.2	645.8	691.7	683.0	638.8
Female	Number in Catch	1	39	56	3		99
	Average Length (mm)	590.0	602.9	616.2	590.0		609.9

Table 7. Kobuk River atmospheric and hydrologic data, 2002.

Date	Water Temp. (C)	Water Gauge (inches) ^a	Secchi (meters)	Percent Cloud Cover
6-Jul	10	0.0	2.00	100
7-Jul	9	-1.0	2.50	75
8-Jul	10	-3.0	2.50	100
9-Jul	10	0.0	2.50	100
10-Jul	11	9.0	3.00	50
11-Jul	11	19.0	2.00	50
12-Jul	11	20.0	2.00	100
13-Jul	11	10.0	2.00	100
14-Jul	12	6.0	2.50	100
15-Jul	13	10.0	2.50	0
16-Jul	13	0.0	3.00	50
17-Jul	15	-1.0	3.50	75
18-Jul	16	-4.0	4.00	0
19-Jul	16	-7.5	3.75	0
20-Jul	16	-9.0	3.75	75
21-Jul	16	-10.5	3.50	75
22-Jul	17	-10.5	3.50	100
23-Jul	16	-7.5	1.75	0
24-Jul	16	-5.5	3.00	0
25-Jul	16	-5.5	2.00	100
26-Jul	15	-4.0	3.00	75
27-Jul	15	-9.5	3.50	75
28-Jul ^b				
29-Jul	15	-18.0	3.75	0
30-Jul	15	-18.0	4.00	0
31-Jul	15	-18.0	3.50	0
1-Aug	15	-18.5	3.75	0
2-Aug	16	-19.5	3.50	0
3-Aug	16	-21.0	4.00	0
4-Aug ^b				
5-Aug	16	-24.0	4.00	0
6-Aug	15	-24.0	3.50	0
7-Aug	14	-25.0	3.50	75
8-Aug	13	-23.5	3.50	0
9-Aug	13	-22.0	3.50	100
10-Aug	13	-22.0	3.50	80
11-Aug	12	-22.0	3.50	75
12-Aug	12	-25.0	3.00	80

^a The gauge is set even (0.0 inches) with the water level at the start of season.

^b Regular day off.

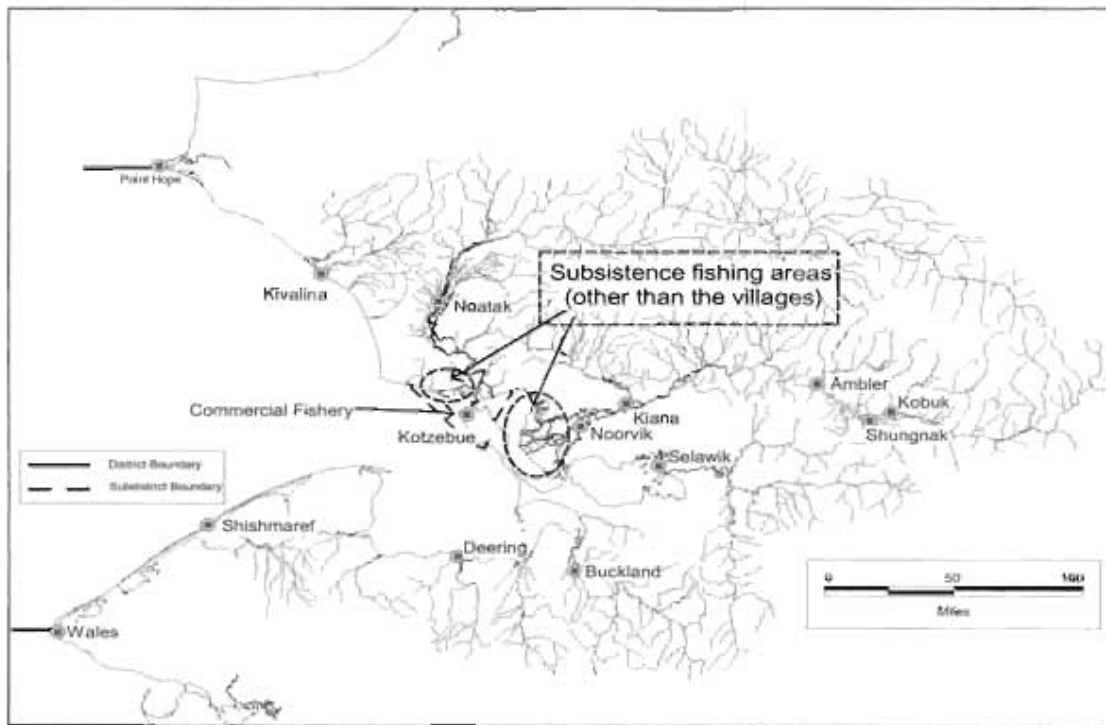


Figure 1. Kotzebue Sound commercial fishing district, villages and subsistence fishing areas.

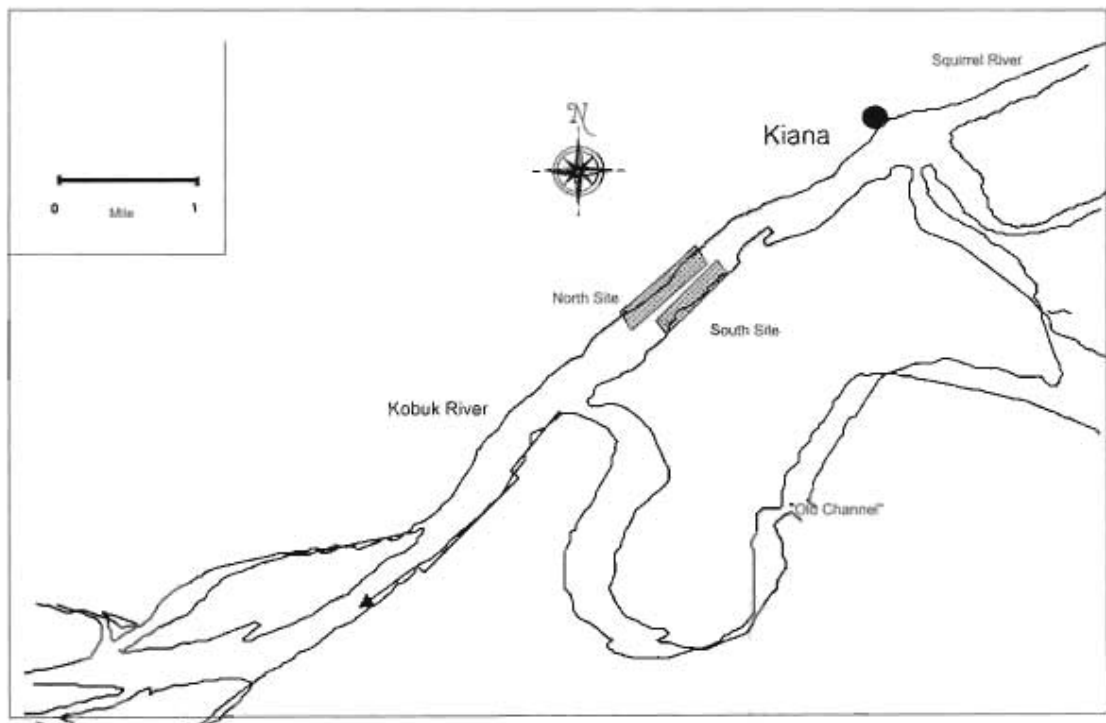


Figure 2. Kobuk River drift test fishing sites.

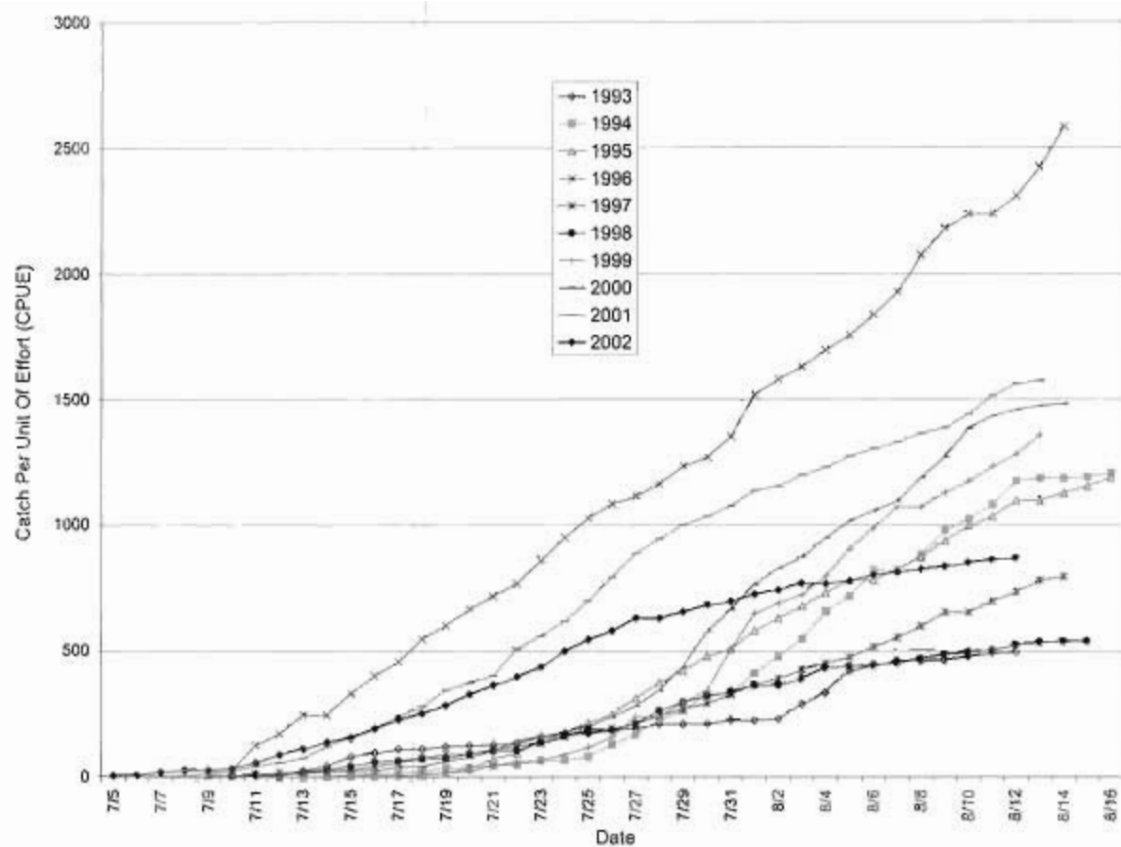


Figure 3. Kobuk River chum salmon drift test fish cumulative CPUE, 1993 - 2002.

Appendix 1. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE, 1993-2002. [page 1 of 2]

Date	1993		1994		1995		1996		1997	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
5-Jul										
6-Jul										
7-Jul										
8-Jul										
9-Jul							12.77	12.77	5.85	5.85
10-Jul							15.00	27.77	0	5.85
11-Jul							98.38	126.15	5.31	11.16
12-Jul	11.18	11.18			0	0	45.54	171.69	7.19	18.35
13-Jul	14.22	25.40	0	0	0.93	0.93	74.29	245.98	a	18.35
14-Jul	20.57	45.97	2.68	2.68	2.80	3.73	a	245.98	6.25	24.60
15-Jul	35.08	81.05	2.58	5.26	2.77	6.50	83.75	329.73	3.65	28.25
16-Jul	13.19	94.24	11.35	16.61	a	6.50	71.35	401.08	14.28	42.53
17-Jul	17.27	111.51	a	16.61	0	6.50	55.49	456.57	15.17	57.70
18-Jul	a	111.51	7.16	23.77	1.81	8.31	89.86	546.43	16.12	73.82
19-Jul	10.71	122.22	12.40	36.17	9.89	18.20	54.74	601.17	17.98	91.80
20-Jul	2.76	124.98	3.65	39.82	16.30	34.50	63.70	664.87	a	91.80
21-Jul	3.20	128.18	7.30	47.12	38.54	73.04	52.12	716.99	18.53	110.33
22-Jul	5.52	133.70	3.56	50.68	21.18	94.22	50.97	767.96	13.28	123.61
23-Jul	27.15	160.85	16.49	67.17	50.58	144.80	91.36	859.32	10.79	134.40
24-Jul	9.06	169.91	a	67.17	28.46	173.26	91.89	951.21	22.86	157.26
25-Jul	a	169.91	14.38	81.55	40.16	213.42	76.80	1028.01	21.57	178.83
26-Jul	15.22	185.13	47.65	129.20	35.15	248.57	55.68	1083.69	14.66	193.49
27-Jul	8.06	193.19	40.66	169.86	63.94	312.51	29.79	1113.48	18.46	211.95
28-Jul	16.36	209.55	57.83	227.69	62.49	375.00	49.06	1162.54	30.53	242.48
29-Jul	0.93	210.48	33.62	261.31	46.11	421.11	70.13	1232.67	28.13	270.61
30-Jul	0.92	211.40	69.21	330.52	57.86	478.97	35.29	1267.96	22.33	292.94
31-Jul	12.58	223.98	a	330.52	29.89	508.86	82.27	1350.23	32.57	325.51
1-Aug	a	223.98	82.16	412.68	72.91	581.77	167.67	1517.90	41.41	366.92
2-Aug	6.74	230.72	65.12	477.80	48.71	630.48	62.02	1579.92	22.41	389.33
3-Aug	57.08	287.80	71.79	549.59	48.40	678.88	48.70	1628.62	35.21	424.54
4-Aug	44.23	332.03	108.98	658.57	53.00	731.88	65.93	1694.55	26.67	451.21
5-Aug	89.30	421.33	59.74	718.31	49.95	781.83	60.33	1754.88	24.47	475.68
6-Aug	18.60	439.93	102.56	820.87	a	781.83	80.47	1835.35	42.25	517.93
7-Aug	20.52	460.45	a	820.87	46.39	828.22	90.99	1926.34	36.00	553.93
8-Aug	a	460.45	62.75	883.62	44.02	872.24	146.94	2073.28	45.07	599.00
9-Aug	1.84	462.29	96.86	980.48	68.22	940.46	106.11	2179.39	55.14	654.14
10-Aug	12.63	474.92	45.83	1026.31	56.33	996.79	56.95	2236.34	a	654.14
11-Aug	18.11	493.03	57.02	1083.33	37.95	1034.74	a	2236.34	43.75	697.89
12-Aug	3.74	496.77	90.54	1173.87	63.92	1098.66	72.29	2308.63	37.36	735.25
13-Aug			11.36	1185.23	a	1098.66	114.63	2423.26	45.93	781.18
14-Aug			a	1185.23	29.35	1128.01	158.13	2581.39	16.01	797.19
15-Aug			5.13	1190.36	25.26	1153.27				
16-Aug			16.23	1206.59	35.04	1188.31				
17-Aug			0	1206.59						
18-Aug			0	1206.59						
19-Aug			3.12	1209.71						
20-Aug			0	1209.71						
21-Aug			a	1209.71						
22-Aug			0	1209.71						
23-Aug			0	1209.71						
24-Aug			0	1209.71						
25-Aug			0.91	1210.62						
26-Aug			5.56	1216.18						
27-Aug			1.86	1218.04						
28-Aug			0.93	1218.97						
29-Aug			0	1218.97						
30-Aug			0	1218.97						

a Regular day off.

Appendix 1. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE, 1993-2002. (page 2 of 2)

Date	1998		1999		2000		2001		2002	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
5-Jul							0	0	5.00	5.00
6-Jul							2.59	2.59	3.39	8.39
7-Jul					1.28	1.28	2.44	5.03	12.50	20.89
8-Jul					0.83	2.11	0.83	5.86	5.98	26.87
9-Jul					0	2.11	10.72	16.58	1.70	28.57
10-Jul	5.22	5.22			2.50	4.61	8.39	24.97	6.83	35.40
11-Jul	0.85	6.07	0	0	3.44	8.05	20.07	45.04	22.86	58.26
12-Jul	a	6.07	0	0	3.45	11.50	12.63	57.67	31.54	89.80
13-Jul	15.89	21.96	0	0	2.54	14.04	17.32	74.99	21.67	111.47
14-Jul	7.53	29.49	0	0	8.57	22.61	45.57	120.56	28.05	139.52
15-Jul	14.07	43.56	0	0	0.87	23.48	38.86	159.42	14.27	153.79
16-Jul	17.33	60.89	0	0	3.38	26.86	32.80	192.22	35.27	189.06
17-Jul	5.07	65.96	4.26	4.26	12.77	39.63	48.77	240.99	36.50	225.56
18-Jul	9.02	74.98	8.48	12.74	3.58	43.21	36.98	277.97	24.41	249.97
19-Jul	a	74.98	5.89	18.63	19.51	62.72	67.08	345.05	30.30	280.27
20-Jul	18.66	93.64	5.11	23.74	14.57	77.29	26.05	371.10	44.91	325.18
21-Jul	11.87	105.51	23.75	47.49	27.69	104.98	29.51	400.61	36.30	361.48
22-Jul	0	105.51	11.91	59.40	41.00	145.98	108.97	509.58	33.08	394.56
23-Jul	29.58	135.09	6.09	65.49	16.29	162.27	50.79	560.37	40.00	434.56
24-Jul	27.33	162.42	24.95	90.44	14.62	176.89	58.96	619.33	62.76	497.32
25-Jul	24.68	187.10	28.73	119.17	22.98	199.87	80.59	699.92	45.64	542.96
26-Jul	a	187.10	39.72	158.89	40.28	240.15	94.06	793.98	34.29	577.25
27-Jul	23.91	211.01	80.39	239.28	41.52	281.67	95.06	889.04	50.41	627.66
28-Jul	51.91	262.92	a	239.28	62.34	344.01	58.24	947.28	a	
29-Jul	34.16	297.08	55.00	294.28	96.00	440.01	54.33	1001.61	25.74	653.40
30-Jul	24.59	321.67	49.66	343.94	138.20	578.21	35.36	1036.97	28.90	682.30
31-Jul	15.69	337.36	160.53	504.47	85.87	664.08	38.63	1075.60	12.68	694.98
1-Aug	25.44	362.80	145.02	649.49	101.16	765.24	61.50	1137.10	27.85	722.83
2-Aug	a	362.80	41.67	691.16	64.37	829.61	16.55	1153.65	19.93	742.76
3-Aug	26.67	389.47	33.19	724.35	44.32	873.93	44.21	1197.86	25.31	768.07
4-Aug	42.35	431.82	74.23	798.58	77.14	951.07	30.71	1228.57	a	
5-Aug	8.57	440.39	108.04	906.62	67.26	1018.33	43.64	1272.21	12.86	780.93
6-Aug	6.00	446.39	82.79	989.41	38.92	1057.25	30.00	1302.21	23.05	803.98
7-Aug	5.11	451.50	82.73	1072.14	37.50	1094.75	26.31	1328.52	10.18	814.16
8-Aug	16.40	467.90	a	1072.14	93.37	1188.12	34.40	1362.92	11.96	826.12
9-Aug	17.20	485.10	55.58	1127.72	81.50	1269.62	23.01	1385.93	8.60	834.72
10-Aug	9.46	494.56	44.73	1172.45	113.67	1383.49	54.88	1440.81	15.27	849.99
11-Aug	10.29	504.85	58.13	1230.58	50.57	1434.06	73.64	1514.45	11.10	861.09
12-Aug	19.44	524.29	48.50	1279.08	24.86	1458.92	47.23	1561.68	7.66	868.75
13-Aug	10.21	534.50	78.37	1357.45	14.57	1473.49	13.04	1574.72		
14-Aug	3.85	538.35			7.83	1481.32				
15-Aug	0	538.35								
16-Aug										
17-Aug										
18-Aug										
19-Aug										
20-Aug										
21-Aug										
22-Aug										
23-Aug										
24-Aug										
25-Aug										
26-Aug										
27-Aug										
28-Aug										
29-Aug										
30-Aug										

a Regular day off.

Appendix 2. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE proportions, 1993-2002. (page 1 of 2)

Date	1993		1994		1995		1996		1997	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
5-Jul										
6-Jul										
7-Jul										
8-Jul										
9-Jul							0.005	0.005	0.007	0.007
10-Jul							0.006	0.011	0.000	0.007
11-Jul							0.038	0.049	0.007	0.014
12-Jul	0.023	0.023			0.000	0.000	0.018	0.067	0.009	0.023
13-Jul	0.029	0.051	0.000	0.000	0.001	0.001	0.029	0.095	a	0.023
14-Jul	0.041	0.093	0.002	0.002	0.002	0.003	a	0.095	0.008	0.031
15-Jul	0.071	0.163	0.002	0.004	0.002	0.005	0.032	0.128	0.005	0.035
16-Jul	0.027	0.190	0.009	0.014	a	0.005	0.028	0.155	0.018	0.053
17-Jul	0.035	0.224	a	0.014	0.000	0.005	0.021	0.177	0.019	0.072
18-Jul	a	0.224	0.006	0.020	0.002	0.007	0.035	0.212	0.020	0.093
19-Jul	0.022	0.246	0.010	0.030	0.008	0.015	0.021	0.233	0.023	0.115
20-Jul	0.006	0.252	0.003	0.033	0.014	0.029	0.025	0.258	a	0.115
21-Jul	0.006	0.258	0.006	0.039	0.032	0.061	0.020	0.278	0.023	0.138
22-Jul	0.011	0.269	0.003	0.042	0.018	0.079	0.020	0.297	0.017	0.155
23-Jul	0.055	0.324	0.014	0.055	0.043	0.122	0.035	0.333	0.014	0.169
24-Jul	0.018	0.342	a	0.055	0.024	0.146	0.036	0.368	0.029	0.197
25-Jul	a	0.342	0.012	0.067	0.034	0.180	0.030	0.398	0.027	0.224
26-Jul	0.031	0.373	0.039	0.106	0.030	0.209	0.022	0.420	0.018	0.243
27-Jul	0.016	0.389	0.033	0.139	0.054	0.263	0.012	0.431	0.023	0.266
28-Jul	0.033	0.422	0.047	0.187	0.053	0.316	0.019	0.450	0.038	0.304
29-Jul	0.002	0.424	0.028	0.214	0.039	0.354	0.027	0.478	0.035	0.339
30-Jul	0.002	0.426	0.057	0.271	0.049	0.403	0.014	0.491	0.028	0.367
31-Jul	0.025	0.451	a	0.271	0.025	0.428	0.032	0.523	0.041	0.408
1-Aug	a	0.451	0.067	0.339	0.061	0.490	0.065	0.588	0.052	0.460
2-Aug	0.014	0.464	0.053	0.392	0.041	0.531	0.024	0.612	0.028	0.488
3-Aug	0.115	0.579	0.059	0.451	0.041	0.571	0.019	0.631	0.044	0.533
4-Aug	0.089	0.668	0.089	0.540	0.045	0.616	0.026	0.656	0.033	0.566
5-Aug	0.180	0.848	0.049	0.589	0.042	0.658	0.023	0.680	0.031	0.597
6-Aug	0.037	0.886	0.084	0.673	a	0.658	0.031	0.711	0.053	0.650
7-Aug	0.041	0.927	a	0.673	0.039	0.697	0.035	0.746	0.045	0.695
8-Aug	a	0.927	0.051	0.725	0.037	0.734	0.057	0.803	0.057	0.751
9-Aug	0.004	0.931	0.079	0.804	0.057	0.791	0.041	0.844	0.069	0.821
10-Aug	0.025	0.956	0.038	0.842	0.047	0.839	0.022	0.866	a	0.821
11-Aug	0.036	0.992	0.047	0.889	0.032	0.871	a	0.866	0.055	0.875
12-Aug	0.008	1.000	0.074	0.963	0.054	0.925	0.028	0.894	0.047	0.922
13-Aug			0.009	0.972	a	0.925	0.044	0.939	0.058	0.980
14-Aug			a	0.972	0.025	0.949	0.061	1.000	0.020	1.000
15-Aug			0.004	0.977	0.021	0.971				
16-Aug			0.013	0.990	0.029	1.000				
17-Aug			0.000	0.990						
18-Aug			0.000	0.990						
19-Aug			0.003	0.992						
20-Aug			0.000	0.992						
21-Aug			a	0.992						
22-Aug			0.000	0.992						
23-Aug			0.000	0.992						
24-Aug			0.000	0.992						
25-Aug			0.001	0.993						
26-Aug			0.005	0.998						
27-Aug			0.002	0.999						
28-Aug			0.001	1.000						
29-Aug			0.000	1.000						
30-Aug			0.000	1.000						

a Regular day off.

Appendix 2. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE proportions, 1993-2002. (page 2 of 2)

Date	1998		1999		2000		2001		2002	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
5-Jul							0.000	0.000	0.006	0.006
6-Jul							0.002	0.002	0.004	0.010
7-Jul					0.001	0.001	0.002	0.003	0.014	0.024
8-Jul					0.001	0.001	0.001	0.004	0.007	0.031
9-Jul					0.000	0.001	0.007	0.011	0.002	0.033
10-Jul	0.010	0.010			0.002	0.003	0.005	0.016	0.008	0.041
11-Jul	0.002	0.011	0.000	0.000	0.002	0.005	0.013	0.029	0.026	0.067
12-Jul	a	0.011	0.000	0.000	0.002	0.008	0.008	0.037	0.036	0.103
13-Jul	0.030	0.041	0.000	0.000	0.002	0.009	0.011	0.048	0.025	0.128
14-Jul	0.014	0.055	0.000	0.000	0.006	0.015	0.029	0.077	0.032	0.161
15-Jul	0.026	0.081	0.000	0.000	0.001	0.016	0.025	0.101	0.016	0.177
16-Jul	0.032	0.113	0.000	0.000	0.002	0.018	0.021	0.122	0.041	0.218
17-Jul	0.009	0.123	0.003	0.003	0.009	0.027	0.031	0.153	0.042	0.260
18-Jul	0.017	0.139	0.006	0.009	0.002	0.029	0.023	0.177	0.028	0.288
19-Jul	a	0.139	0.004	0.014	0.013	0.042	0.043	0.219	0.035	0.323
20-Jul	0.035	0.174	0.004	0.017	0.010	0.052	0.017	0.236	0.052	0.374
21-Jul	0.022	0.196	0.017	0.035	0.019	0.071	0.019	0.254	0.042	0.416
22-Jul	0.000	0.196	0.009	0.044	0.028	0.099	0.069	0.324	0.038	0.454
23-Jul	0.055	0.251	0.004	0.048	0.011	0.110	0.032	0.356	0.046	0.500
24-Jul	0.051	0.302	0.018	0.067	0.010	0.119	0.037	0.393	0.072	0.572
25-Jul	0.046	0.348	0.021	0.088	0.016	0.135	0.051	0.444	0.053	0.625
26-Jul	a	0.348	0.029	0.117	0.027	0.162	0.060	0.504	0.039	0.664
27-Jul	0.044	0.392	0.059	0.176	0.028	0.190	0.060	0.565	0.058	0.722
28-Jul	0.096	0.488	a	0.176	0.042	0.232	0.037	0.602	a	0.722
29-Jul	0.063	0.552	0.041	0.217	0.065	0.297	0.035	0.636	0.030	0.752
30-Jul	0.046	0.598	0.037	0.253	0.093	0.390	0.022	0.659	0.033	0.785
31-Jul	0.029	0.627	0.118	0.372	0.058	0.448	0.025	0.683	0.015	0.800
1-Aug	0.047	0.674	0.107	0.478	0.068	0.517	0.039	0.722	0.032	0.832
2-Aug	a	0.674	0.031	0.509	0.043	0.560	0.011	0.733	0.023	0.855
3-Aug	0.050	0.723	0.024	0.534	0.030	0.590	0.028	0.761	0.029	0.884
4-Aug	0.079	0.802	0.055	0.588	0.052	0.642	0.020	0.780	a	0.884
5-Aug	0.016	0.818	0.080	0.668	0.045	0.687	0.028	0.808	0.015	0.899
6-Aug	0.011	0.829	0.061	0.729	0.026	0.714	0.019	0.827	0.027	0.925
7-Aug	0.009	0.839	0.061	0.790	0.025	0.739	0.017	0.844	0.012	0.937
8-Aug	0.030	0.869	a	0.790	0.063	0.802	0.022	0.865	0.014	0.951
9-Aug	0.032	0.901	0.041	0.831	0.055	0.857	0.015	0.880	0.010	0.961
10-Aug	0.018	0.919	0.033	0.864	0.077	0.934	0.035	0.915	0.018	0.978
11-Aug	0.019	0.938	0.043	0.907	0.034	0.968	0.047	0.962	0.013	0.991
12-Aug	0.036	0.974	0.036	0.942	0.017	0.985	0.030	0.992	0.009	1.000
13-Aug	0.019	0.993	0.058	1.000	0.010	0.995	0.008	1.000		
14-Aug	0.007	1.000			0.005	1.000				
15-Aug	0.000	1.000								
16-Aug										
17-Aug										
18-Aug										
19-Aug										
20-Aug										
21-Aug										
22-Aug										
23-Aug										
24-Aug										
25-Aug										
26-Aug										
27-Aug										
28-Aug										
29-Aug										
30-Aug										

a Regular day off.

Appendix 3. Kobuk River chum salmon drift test fish comparison, 1993-2002.

Year	Project Operation Dates	Number of test fish drifts	Number of days off inseason ^a	Rank by number of drifts	Cumulative CPUE	Rank by cumulative CPUE
1993	7/12-8/12	164	4	10	496.77	10
1994	7/13-8/30	248	6	1	1,218.97	5
1995	7/12-8/16	196	3	7	1,188.31	6
1996	7/09-8/14	208	2	5	2,581.39	1
1997	7/09-8/14	202	3	6	797.19	8
1998	7/10-8/15	182	4	8	538.35	9
1999	7/11-8/13	176	2	9	1,357.45	4
2000	7/07-8/14	228	0	3	1,481.32	3
2001	7/05-8/13	230	0	2	1,574.72	2
2002	7/05-8/12	218	2	4	868.75	7

^a A day during the season where the crew had the day off and no test fishing occurred.

Appendix 4. Kobuk River test fish and Kotzebue commercial catch data, 1993 - 2002.

Year	Date	Drifts	CPUE	Commercial Catch	Subsistence Kobuk River	Total Catch	Kobuk River Escapement ^a
1993	7/12 - 8/12	164	496.77	73,071	^b	73,071	31,697
1994	7/13 - 8/30	248	1,218.97	153,452	26,612	180,064	
1995	7/12 - 8/16	196	1,188.31	290,730	38,867	329,597	64,219
1996	7/09 - 8/14	208	2,581.39	82,110	39,076	121,186	131,105
1997	7/09 - 8/14	202	797.19	142,720	25,242	167,962	
1998	7/10 - 8/15	182	538.35	55,907	21,398	77,305	
1999	7/11 - 8/13	176	1,357.45	138,605	27,958	166,563	48,748
2000	7/07 - 8/14	228	1,481.32	159,802	21,538	181,340	
2001	7/05 - 8/13	232	1,574.72	211,672	29,193 ^c	240,865	
2002	7/05 - 8/12	218	868.75	8,390	^d		

^a The escapement goal for rivers surveyed in the Kobuk River system is 30,500 chums. Years in which there were poor aerial survey conditions, or no surveys done, were left blank in the table.

^b Several Kobuk River villages were not surveyed in 1993.

^c Ambler village was not surveyed in 2001.

^d Subsistence survey data not yet available.

Appendix 5. Kobuk River chum salmon drift test fish time and site distribution expressed as mean CPUE, 1993-2002.

Year	Mean CPUE by Drift Period ^a			Yearly Mean CPUE	Percent Mean CPUE by Drift Period			Mean CPUE by Site ^b		Yearly Mean CPUE	Percent Mean CPUE by Site	
	1	2	3		1	2	3	N	S		N	S
1993	13.0	21.3	15.9	16.7	25.8	42.5	31.6	3.4	8.5	6.0	28.6	71.4
1994	25.8	33.2	23.7	27.6	31.2	40.1	28.7	1.7	18.6	10.1	8.4	91.6
1995	32.1	37.6	39.9	36.5	29.3	34.3	36.4	8.5	16.2	12.4	34.3	65.7
1996	73.2	81.7	66.5	73.8	33.1	36.9	30.0	13.7	36.4	25.0	27.3	72.7
1997	23.9	23.3	23.6	23.6	33.7	32.9	33.4	4.3	11.4	7.8	27.3	72.7
1998	18.6	19.4	13.1	17.0	36.4	38.1	25.6	2.8	8.6	5.7	24.4	75.6
1999	49.7	38.6	25.4	37.9	43.7	34.0	22.3	5.2	25.5	15.4	17.0	83.0
2000	40.9	36.7	36.1	37.9	35.9	32.3	31.8	9.1	16.3	12.7	35.8	64.2
2001	47.8	34.1	34.8	38.9	41.0	29.2	29.8	8.0	18.4	13.2	30.2	69.8
2002	20.9	26.5	22.9	23.5	29.7	37.7	32.6	4.3	11.0	7.6	28.0	72.0

^a Drift 1 begins at 0800, Drift 2 at 1500 and Drift 3 at 2200. There are two drifts (one on each riverbank) in each drift period.

^b Site N is the North Bank and Site S is the South Bank. The Mean CPUE is the cumulative CPUE for each riverbank for the season divided by the number of drifts on that riverbank during the season.

Appendix 6. Comparison of age and sex compositions by year for Kobuk River test net chum salmon catch, 1993 - 2002.

Year	Date	No. of samples	Percent by Sex		Percent by Age Group				
			Male	Female	0.2	0.3	0.4	0.5	0.6
1993	7/17-8/12	462	52.6	47.4	1.7	28.8	66.0	3.5	0.0
1994	7/13-8/29	624	63.0	37.0	3.0	58.0	36.6	2.4	0.0
1995	7/13-8/16	1,025	63.3	36.7	2.2	61.5	34.0	2.2	0.0
1996	7/09-8/18	1,633	54.8	45.2	0.5	31.9	58.4	8.9	0.3
1997	7/09-8/14	756	56.2	43.8	1.3	23.9	59.3	15.2	0.3
1998	7/10-8/15	536	43.5	56.5	4.9	51.3	31.0	11.9	0.9
1999	7/17-8/13	913	59.7	40.3	0.4	92.0	5.9	1.4	0.2
2000	7/07-8/14	635	47.1	52.9	1.1	60.9	37.6	0.3	0.0
2001	7/06-8/13	930	42.0	58.0	1.9	36.9	58.6	2.6	0.0
2002	7/05-8/12	793	45.0	55.0	0.1	24.8	67.2	7.8	0.0

Appendix 7. Comparison of age and sex compositions by year for Kotzebue commercial chum salmon catch, 1993 - 2002.

Year	Date	No. of samples	Percent by Sex		Percent by Age Group				
			Male	Female	0.2	0.3	0.4	0.5	0.6
1993	7/09-8/28	1,870	52.3	47.7	1.4	20.4	73.3	4.8	0.2
1994	7/12-8/24	3,614	55.2	44.8	3.3	63.0	30.8	2.9	0.0
1995	7/11-8/26	4,621	51.4	48.6	2.2	58.9	36.9	1.9	0.0
1996	7/08-8/26	2,386	49.6	50.4	0.9	40.7	48.9	9.0	0.4
1997	7/10-8/29	4,824	57.6	42.4	1.4	28.7	58.3	10.2	1.4
1998	7/10-8/30	3,128	57.2	42.8	6.2	50.4	29.3	13.3	0.7
1999	7/13-8/27	3,288	51.3	48.7	0.9	87.5	10.6	0.9	0.2
2000	7/11-8/24	3,179	39.2	60.7	2.1	61.6	35.2	1.0	0.0
2001	7/10-8/24	3,670	41.9	58.1	2.4	45.7	49.9	2.0	0.1
2002	No samples taken because of lack of a major buyer in 2002.								

Appendix 8. Comparison of age and sex compositions by year for Noatak River test net chum salmon catch, 1993 - 2002.

Year	Date	No. of samples	Percent by Sex		Percent by Age Group				
			Male	Female	0.2	0.3	0.4	0.5	0.6
1993	7/24-9/13	956	42.6	57.4	4.8	34.2	58.8	1.8	0.3
1994	7/22-9/10	1,160	47.6	52.6	3.1	68.5	26.8	1.6	0.0
1995	7/20-8/29	1,266	49.2	50.8	2.0	56.1	39.8	1.9	0.2
1996	7/28-8/27	347	45.5	54.5	0.6	47.0	45.5	6.9	0.0
1997	7/27-8/28	214	67.3	32.7	0.5	34.1	56.1	8.9	0.5
1998	7/27-8/28	284	53.1	46.9	5.6	70.1	21.5	2.5	0.3
1999	8/14-8/29	140	52.9	47.1	0.7	80.7	17.1	0.7	0.7
2000	No test fishing occurred in 2000.								
2001	8/08-8/15	257	28.8	71.2	4.7	72.4	21.4	1.6	0.0
2002	7/13-8/14	171	42.1	57.9	0.6	42.1	53.2	3.5	0.6

Appendix 9. Comparison of length by age, sex and year for Kobuk River test net chum salmon catch, 1993 - 2002.

Year	Date	No. of samples	Sex	Age Group				
				0.2	0.3	0.4	0.5	0.6
1993	7/17-8/12	462	Male	565	611	624	629	
			Female	557	580	594	623	
1994	7/13-8/29	624	Male	561	603	622	624	
			Female	559	587	601	599	
1995	7/13-8/16	1,025	Male	577	604	618	627	
			Female	553	588	595	599	
1996	7/09-8/18	1,633	Male	570	615	636	636	643
			Female	592	599	611	618	645
1997	7/09-8/14	756	Male	562	619	637	647	613
			Female	550	596	613	624	
1998	7/10-8/14	536	Male	577	618	636	636	
			Female	562	592	607	623	616
1999	7/17-8/13	913	Male	573	608	607	609	590
			Female		592	587	580	610
2000	7/07-8/14	635	Male	570	596	616	570	
			Female	566	581	591	580	
2001	7/06-8/13	930	Male	583	606	621	629	
			Female	575	583	599	622	
2002	7/05-8/12	793	Male	641	650	648	647	
			Female	585	608	617	608	614

Appendix 10. Comparison of length by age, sex and year for Kotzebue chum salmon catch, 1993 - 2002.

Year	Date	No. of samples	Sex	Age Group				
				0.2	0.3	0.4	0.5	0.6
1993	7/09-8/28	1,870	Male	589	619	633	641	701
			Female	572	597	610	620	625
1994	7/12-8/24	3,614	Male	567	601	621	629	
			Female	566	582	600	601	
1995	7/11-8/28	4,621	Male	577	614	625	638	638
			Female	574	592	602	614	
1996	7/08-8/26	2,386	Male	562	609	632	639	642
			Female	558	586	606	608	632
1997	7/10-8/29	4,824	Male	564	610	639	654	663
			Female	560	588	609	620	641
1998	7/10-8/30	3,128	Male	583	619	632	646	669
			Female	579	600	614	627	621
1999	7/13-8/27	3,288	Male	583	609	636	626	636
			Female	579	600	614	627	621
2000	7/11-8/24	3,179	Male	576	618	638	637	
			Female	572	593	611	615	
2001	7/10-8/24	3,670	Male	574	607	633	633	630
			Female	565	585	608	622	588
2002	No samples taken because of lack of a major buyer in 2002.							

Appendix 11. Comparison of length by age, sex and year for Noatak River test net chum salmon catch, 1993 - 2002.

Year	Date	No. of samples	Sex	Age Group				
				0.2	0.3	0.4	0.5	0.6
1993	7/24-9/13	956	Male	542	581	604	625	652
			Female	539	558	572	562	650
1994	7/22-9/10	1,160	Male	543	580	604	643	
			Female	525	558	574	579	
1995	7/20-8/29	1,266	Male	576	597	609	622	620
			Female	547	569	576	589	600
1996	7/28-8/27	347	Male		608	631	639	608
			Female	547	593	604	616	
1997	7/27-8/28	214	Male		565	613	636	653
			Female		604	619	625	
1998	7/27-8/28	284	Male	560	606	621	634	
			Female	566	589	601	606	576
1999	8/14-8/29	140	Male	627	613	625	628	623
			Female	560	606	621	634	
2000	No test fishing occurred in 2000.							
2001	8/08-8/15	257	Male	567	600	627	655	
			Female	554	576	602	577	
2002	7/13-8/14	171	Male		625	646	692	683
			Female	590	603	616	590	